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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/900,293	07/06/2001	Ranganathan Nagarajan	33726-00016	6097

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT

PAPER NUMBER

1763

DATE MAILED: 08/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/900,293	Applicant(s) NAGARAJAN, RANGANATHAN	
	Examiner Luz L. Alejandro	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Specification

The disclosure is objected to because of the following informalities: it appears that "um" has been used throughout the specification to represent micrometers, however the correct unit should be " μm ". The acronym STS is not defined (see page 14-line19).

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 20-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification, as originally filed, does not provide a description of the claimed apparatus. Especially, the claimed etching tool and the opening enlarging tool have not been described in the specification.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 20-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 20 is directed to an apparatus for etching comprising "...an etching tool for performing vertical etch process steps on said layer of material; and an opening enlarging tool for performing steps of enlarging said opening in said mask, said etching tool and said opening enlarging tool operating in an alternating manner to form a trench of a desired depth in said layer of material.". It is not clear what applicant is claiming as its invention. Applicant in the instant specification states that "the process can be efficiently carried out using an ICP RIE tool or another suitable tool ... In general, the process can be implemented with any etch tool that has the capability to run two etch processes alternately such as an STS multiplex ICP etch system." (see page 14-line 17 to page 15-line1 of the instant specification). Therefore, for examination purposes, any etch tool that has the capability to run two etch processes alternately, such as an ICP RIE apparatus, will meet the claim limitations.

Claims 23 and 24 recite the limitation "said resist etch process tool" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

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(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 20-22 and 24 are rejected under 35 U.S.C. 102(b) as being anticipated by Nowak et al., U.S. Patent 5,865,896.

Nowak et al. discloses an apparatus which is capable of performing an etching process, having inductive and capacitive coupling modes which can be selected individually or in combination. Note that the apparatus comprises a coil antenna 26, a ceiling 24 and a wafer pedestal 44, all which can be connected to either ground or to a RF power through switches 34, 38, and 52, respectively. The apparatus of Nowak et al. is capable of being used as an ICP RIE etching apparatus and is capable of running two etch processes alternately. Furthermore, note that the apparatus of Nowak et al. has the claimed etching tool and the claimed opening enlarging tool.

With respect to claims 21-22 and 24, such limitations are directed to method limitations instead of apparatus limitations and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand since a variety of methods can be done with the apparatus. The method limitations are viewed as intended use which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Nowak et al. is capable of etching a wafer comprising said claimed mask and resist layer, and is capable of operating in a multi step manner.

Claims 20-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Koshimizu, U.S. Patent 5,935,373.

Koshimizu discloses an apparatus which is capable of performing an etching process, having inductive and capacitive coupling modes which can be selected individually or in combination. Note that the apparatus comprises a coil antenna 112, and a wafer pedestal 106, connected to RF powers 118 and 132, respectively, and grounded sidewalls 102. The apparatus of Koshimizu is capable of running two etch processes alternately. Furthermore, note that the apparatus of Koshimizu has the claimed etching tool and the claimed opening enlarging tool incorporated in a tool that operates in a pulsed manner.

With respect to claims 21-22 and 24, such limitations are directed to method limitations instead of apparatus limitations and since an apparatus is being claimed as the instant invention, the method teachings are not considered to be the matter at hand since a variety of methods can be done with the apparatus. The method limitations are viewed as intended use which do not further limit, and therefore do not patentably distinguish the claimed invention. The apparatus of Koshimizu is capable of etching a wafer comprising said claimed mask and resist layer, and is capable of operating in a multi step manner.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nowak et al., U.S. Patent 5,865,896 in view of Koshimizu, U.S. Patent 5,935,373.

Nowak et al. is applied as above but does not expressly disclose that the etch process tool and the opening enlarging tool are incorporated in a tool that operates in a pulsed manner. Koshimizu discloses a plasma apparatus comprising an antenna 112, and a wafer pedestal 106, being connected to RF powers 118 and 132, respectively, that can be pulsed in order to control the characteristics of the process being performed in the apparatus (see figs. 1, 2 and 3a-3b, and their descriptions). Therefore, in view of this disclosure, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the apparatus of Nowak et al. as to incorporate the etch process tool and the opening enlarging tool in a tool that operates in a pulsed manner in order to control the characteristics of the process being performed in the apparatus.

Conclusion


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 703-305-4545. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory L. Mills can be reached on 703-308-1633. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.


Luz L. Alejandro
Primary Examiner
Art Unit 1763

July 31, 2003